SPEED. REDEFINED

AN UNEQUALED EVOLUTION IN 2068 COMPUTING.

Imagine: you slide into your seat, select a program disk and slip it into your disk drive. In about the time it takes your finger to press the button, your selected program is up and running.

Realize: you don't have to imagine anymore—The new **Millennia K** disk interface and disk drive system from Ramex will enable your 2068 to operate in the league of computers costing 5 to 10 times as much! In fact, when it comes to maximum transfer rates, total storage capacity per disk and efficiency of formatted operation, the **Millennia K** will out perform Commodore, Apple *IIe* or IBM PC!

In order to extract the maximum efficiency from the disk, a whole new operating system had to be devised; the result: **SP-DOS.**

SP-DOS offers these operating features:

- **Loads 32K per second!**
- **Stores 820K per disk**
- **Occupies only 4K ram**
- **Compatible with most software**

Super support!—a whole new generation of Disk Software:

- **Tasword II (Word Processing)**
- **Tasmerge (Mailmerge)**
- **Masterfile (Database)**
- **Omnicalc II (Spreadsheet)**
- **Devpac (Assembler)**

Language Support: • **Basic** • **Disk Pascal** • **"C" Language Compiler**

The **SP-DOS** system allows you to use all the Timex cassette commands such as: • Save " " • Load " " • Save Data " " • Load Data " " • Save Screen$ " " • Load Screen$ " " • And all the Micro Drive Commands

Drives that may be used include Qume, Tandon, MPI, Teac, Shugart etc. Drive #1 is double sided, Quad density, 160 tracks. Drives #2,3,4 may be single or double sided, Double or Quad density.

You can wait and hear about the **Millennia K** from everyone else, or take action now and start drivin' today!

The **Millennia K** interface only: **$200.00**

The Package: $450.00 + $5.00 S/H

includes Drive #1, case, P/S, cables and interface.

Orders are now being taken however, due to tremendous demand for the **Millennia K** interface system, orders will be on a strict first come, first serve basis. Reserve your system today. Send check or money order or call 1-313-731-2163 for Visa and MasterCard orders. Michigan residents please add 4%.

Ramex™
International Ltd.

48945 VAN DYKE ROAD
UTICA, MICHIGAN 48087
TELE: 01-313-463-1795

In the Fall of 1983, the people of Ramex were planning the product lines they would offer for 1984.

The discussion that day centered on two much needed products: a professional quality word processing program, and a reliable disk interface system which would allow the Timex 2068 to operate in the league of computers costing ten to fifteen times as much.

Well, as you know if you own a Tasword II word processing program, Ramex brought to market what some people regard as the finest in 2068 word processing—
So what about the second category?

Well, after painstaking research and many setbacks endured amidst rumors of other impending systems, Ramex is proud to announce the arrival and imminent availabilty of a complete disk-interface system — which quite frankly exceeds every expectation, explodes the original mandate Ramex was working from, and which is already redefining the process of 2068 computing.

Some Background

This industry standard magnetic storage medium is basically a circular piece of flexible plastic (5.25" diameter) which has been coated with a magnetic material similar to the one used for magnetic tapes. The flexible disk is then placed in a protective jacket which allows the disk to rotate freely.

Before a floppy disk can be used, it has to be formatted i.e. magnetically divided into a number of concentric circles known as TRACKS. Originally, 35 tracks per surface was the norm. 40 tracks followed soon after, while developments in the field of magnetic recording made the 80 track/surface a reality. The track density was thus increased from 48 tpi (tracks per inch) to 96 tpi. This latter density, used with double density recording, has become known as QUAD DENSITY.

Each track is logically divided into SECTORS and the sector boundaries can be identified by means of HARD or SOFT SECTORING. Hard sectoring - virtually abandoned today - marks the beginning of each sector with a physical hole. The beginning of the 1st sector and end of the last, is identified by an extra hole known as the INDEX. The disadvantage of this method is that each track has a FIXED number of sectors and hence a fixed capacity.

Soft sectoring (used by **SP-DOS**) uses an INDEX hole to identify the boundary between the last and first sectors. There are no other holes, so the division into sectors is done in software. A track can then be divided into any number of sectors (within limits), usually 5, 10, 16, 26.

Recording Standards

SINGLE DENSITY or IBM 3740 standard.
This is also known as F.M. (Frequency Modulation).

Data is recorded SERIALLY on each track. Each bit defines an 8 microsecond BIT CELL at the beginning of which, a 200 nanosecond CLOCK bit is recorded.

As the length of a bit cell is 8 microseconds, the "capacity" of a track can be calculated:

No. of bits/track = (Time for 1 revolution)/(Time for 1 bit)
= 0.2 sec/8 microsec 25;000 bits
= 3125 bytes/track.

This is obviously the UNFORMATTED capacity.

Data rate
25,000 bits/0.2 sec = 125,000 bits/sec.

Single-Density is very easy to implement and works reliably even with low-quality drives. Disk input/output routines are easy to write as data bytes have to be read or written at the rate of one in every 64 microseconds.

DOUBLE DENSITY or IBM SYSTEM 34 standard. Used by **SP-DOS.**
This is also known as M.F.M. (Modified F.M.).

Data is also broken into bit-cells, with the data bit written in the center of the bit-cell if it is a logic 1. Clocks are only written if BOTH surrounding data bits are logic 0. The bit cell is now 4 microseconds long and hence, twice as much data can be stored.

Track capacity = (0.2 sec)/(4 microsec)
= 50,000 bits = 6250 bytes. i.e.

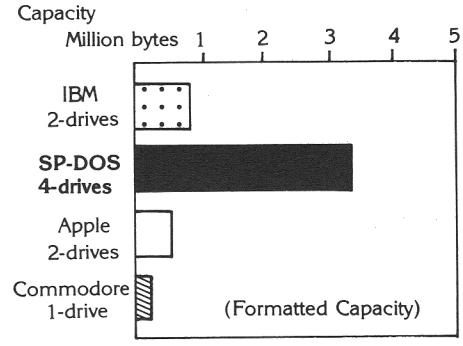
160 tracks x 6250 bytes = 1,000,000 bytes/disk

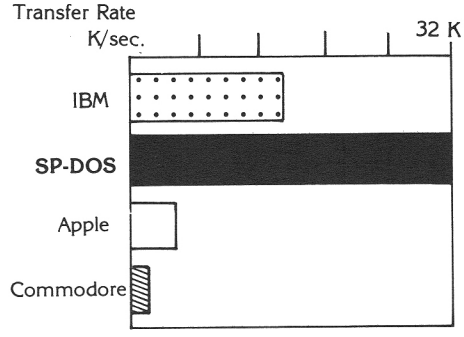
Effective rate = (50,000 bits)/(0.2 sec)
= 250,000 bits/sec. i.e. 32K/sec.

Byte servicing time is now only 32 microseconds which can only be achieved by using a fast microprocessor and highly optimised code.

Up till now we have only talked about **unformatted** capacity. Again, **SP-DOS** outperforms the norm by providing 82% efficiency, that's 800K per disk! (.82 x 1,000,000 bytes). Some lesser systems i.e. IBM use almost ⅓ of the disk space for format, simply: 500K drives = 360K storage, only 72% efficiency.

The following graphs illustrate the astounding capacity





Orders are now being taken however, due to tremendous demand for the **Millennia K** interface system orders will be on a strict first come, first serve basis. Reserve your system today.

Please inquire about custom formatting.

Manual may be purchased separately ($10.00 - Refundable with purchase).

Ramex™ International Ltd.

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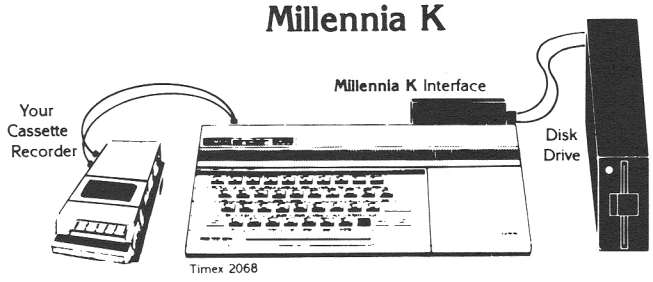
The Interface: $200.00

Drive # 1 $250.00

(When purchased with the interface: includes case, P/S, and cables)

Millennia K



Name _____
Address _____
City/State _____
Zip _____
Phone _____

Please reserve my disk system
Enclosed is: ☐ $200.00 for the interface
☐ $455.00 for I/F and drive # 1
(Includes $5.00 S/H)

Signature _____
☐ Visa ☐ Master Card
_____ **Exp.** _____